

1961 ANNUAL REPORT

ARCTIC-YUKON-KUSKOKWIM AREA



DIVISION OF COMMERCIAL FISHERIES

ALASKA DEPARTMENT OF FISH AND GAME

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INTRODUCTION

The Arctic-Yukon-Kuskokwim Area of the Commercial Fisheries Division encompasses all drainages in Alaska north of Bristol Bay, an area of some 400,000 square miles. The permanent management staff for this area consists of one area biologist and two assistants.

This is an area of very little industrialization and most of the people are dependent on the fish and game resources directly for a livelihood. The fisheries in this area are of two distinct types, commercial and subsistence. The subsistence fishery has been prosecuted for years to feed the people and their dogs throughout the long winter months. The sled dog is one of the sole means of transportation in the winter and without it trapping activities would be seriously hampered. However, contact with a western economy over the years has started these people, Eskimos and Indians, through the transition from a subsistence to a cash economy. Subsistence is of course still the most important single use of the fish and game resources of the area, but in most cases a commercial fishery is feasible on the same stocks provided ample precautions are taken to safeguard the subsistence

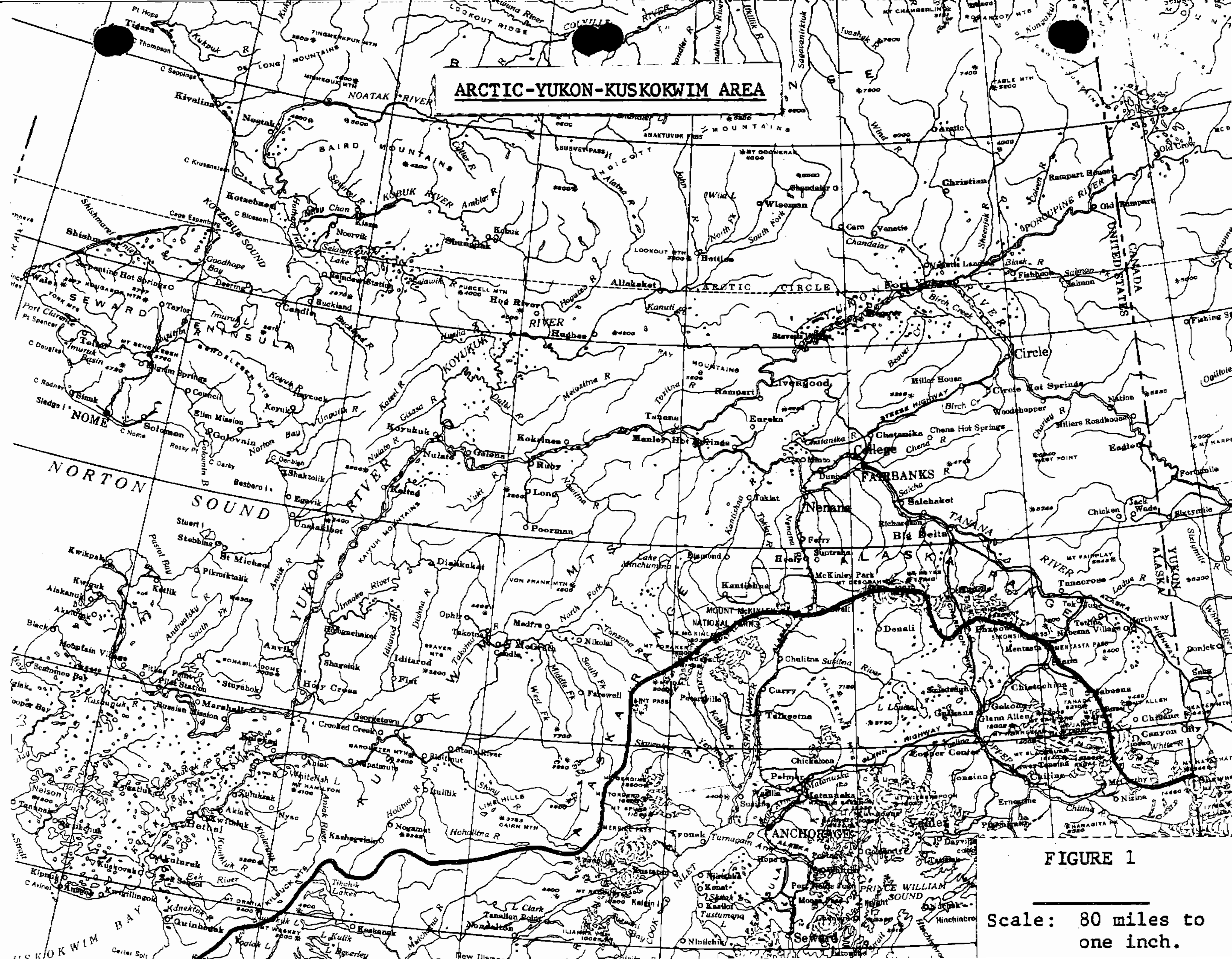


FIGURE 1

Scale: 80 miles to
one inch.

population size, racial composition and the utilization of the chum salmon run, the largest salmon run in the Yukon River. This is to be accomplished by an intensive tag and recovery program on the Lower Yukon coupled with a survey of the subsistence fishery. The program began in April 1961 and will terminate December 1962.

This project is supported by Federal Government funds and is one of several emergency salmon research studies being conducted in the state. Information resulting from this investigation will be used at the International North Pacific Fisheries Commission meeting in 1963 when North Pacific problems involving treaty matters will be discussed by a commission of representatives from Japan, Canada and the United States.

The 1961 field season was concerned mainly with gear experimentation and testing of various fishing locations, while the main tag and recovery effort is scheduled in 1962. Fishwheels were placed between St. Marys and Mt. Village, approximately 87 miles upstream from the mouth. A total of 1,097 chums, 30 kings, 22 pinks and 14 cohos were tagged with Petersen disc tags. Salmon species other than chum salmon were tagged utilizing state funds. Lengths and sex were

determined and scale samples were taken from tagged salmon. A reward of \$1.00 was paid for recovered tags.

There were two distinct runs of chum salmon that passed through the Lower Yukon, referred to in this report as the early-run and late-run chums. The early-run chums appeared in the Lower Yukon from early June through July and the late-run chums from July through September. Many of the late-run chums migrate for at least a portion of their upstream migration under the ice. The late-run chums were on the average larger, of a more robust condition and had not developed secondary sex characteristics to the degree present in most of the early-run chums.

A total of 344 recoveries of tagged chum salmon were made representing a 31% recovery of all tagged chums. Tagged fish were recovered by both the commercial and subsistence fishery with gill nets and fishwheels. Thirty (30%) per cent of the recoveries were made downstream and 70% were made upstream from the tagging site. The majority of downstream recoveries, however, were made at Mt. Village, an intense fishing area located 9 miles below the tagging site. This movement downstream has been noted in other river tagging studies. The farthest downstream recovery was made at Sheldons

Point (South Mouth) and the farthest upstream recovery has been from Dawson City in Canada, some 1,220 miles above the tagging site.

Of the early-run chums recovered, less than 1% were recovered above Koyukuk (500 miles upstream from mouth) while 33% of late-run recoveries were made above Koyukuk. Therefore, although relatively few late-run chums were tagged and subsequently recovered, it appears that most of them are traveling farther upstream to spawn than their earlier-run counterparts.

Migration rates for early-run chums ranged from 8.7 to 26.1 miles a day with an average rate of travel of 18.6 miles a day. Late-run chums traveled from 4.2 to 20.7 miles a day with an average rate of travel of 13.3 miles a day.

By use of a tag and recovery program in 1962 an all out attempt will be made to estimate the number of chum salmon that migrate up the Yukon River. Six fishwheels in the vicinity of Mt. Village will be used to capture salmon. An upriver fishing village, to be selected, will serve as a recovery site. Alaska Department of Fish and Game personnel will live in the village and tabulate the numbers of tagged and untagged salmon taken by the native fishermen. By

knowing the tagged to untagged ratio of salmon recovered and the number of salmon tagged, an estimate of the number of salmon that passed through the tagging area can be made. A total of 10 seasonal employees and two Alaska Department of Fish and Game biologists will comprise the project personnel.

1961 Yukon Subsistence Survey

A survey of the subsistence catch of all salmon species was made by two Fish and Game Aides by boat from the mouth of the Yukon upstream to and including Dawson City in Canada. In addition the survey extended upstream on the Tanana River from its mouth to and including Nenana. Counts were obtained by enumerating fish on the drying racks and in smokehouses in virtually every fishing camp and village along the survey route. After reaching Dawson City the survey team ran downriver to St. Marys on the Lower Yukon where boat and equipment were stored. The catch of coho salmon was not assessed as this species had not begun to appear in most villages at the time of the survey. Chum salmon were still being caught in large numbers in many of the villages above Galena after the survey team passed through, and for this reason alone the chum catch is at best a minimal figure. The king salmon catch is probably more near the total seasonal catch since this species

had already passed through the various villages at the times of survey.

Due to differences in utilization of and dependence on the fishery resource, fishing methods, and geography the Yukon River from the mouth to Dawson City in Canada and including the Tanana River has been divided into six districts. Comparative catches for these districts are presented graphically in Figure 2 on page 10.

Table I shows mileages upriver from the mouth for various points on the Yukon.

TABLE I
MILEAGE - YUKON RIVER

The following distances were taken from U.S.G.S. topographic maps, scale 1:250000 and 1:63360. Measurements were taken with a Tacro map measurer and represent distances upriver from Nilak, a village on the south mouth of the Yukon.

<u>VILLAGE</u>	<u>MILES</u>	<u>VILLAGE</u>	<u>MILES</u>
Alakanuk	8.0	Pilot Station	113.0
Kwiguk	15.0	Pilot Village	129.0
Mouth, Aproka Pass	26.0	Marshall	152.0
Fish Village	43.0	Paimiut	242.0
Anuk River	54.0	Holy Cross	270.0
Mt. Village	78.5	Anvik	308.0
Site #1	87.0	Kaltag	441.0
Old Andreafsky	88.5	Nulato	475.0
Pitkas Point	94.0	Koyukuk	493.0
(St. Marys is 4 miles up- stream from Pitkas Point on Andreafsky River)		Koyukuk River	498.5
		Galena	521.0

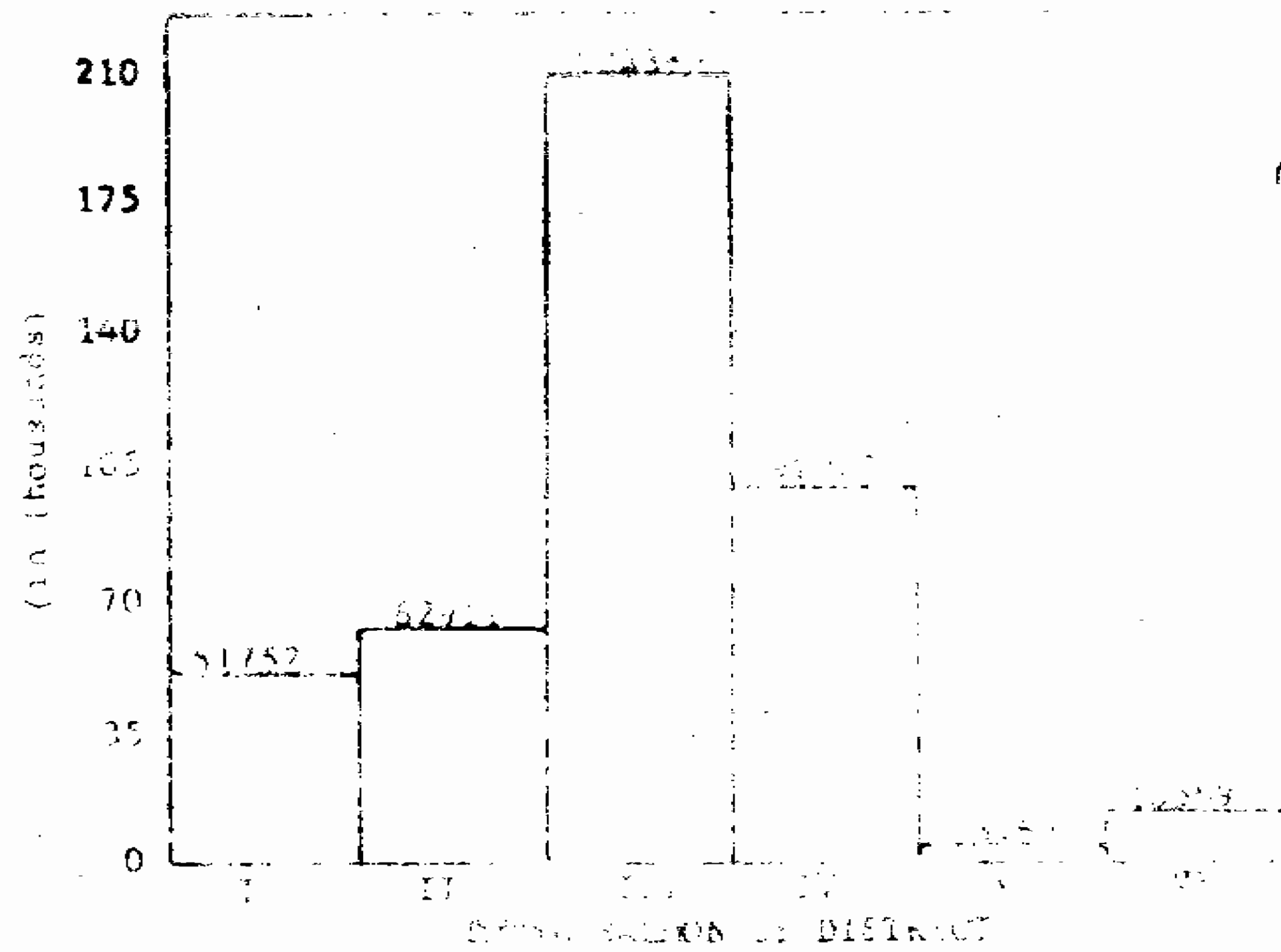
<u>VILLAGE</u>	<u>MILES</u>	<u>VILLAGE</u>	<u>MILES</u>
Ruby	572.5	Venetie Landing (Mouth of	
Melozitna River	574.5	Chaldalar River	973.0
Kokrines	599.0	Fort Yukon (Mouth of Porcu-	
Tanana	686.5	pine River)	993.0
Fish and Wildlife Tagging		Circle	1,052.0
Battery (1961) at Texas		Charley River	1,115.0
Creek	724.0	Kandik River	1,126.0
Fish and Wildlife Recovery		Eagle	1,204.0
Battery	749.0	Canadian Border	1,215.0
Rampart	754.0	Dawson	1,310.0
Stevens Village	838.0	Whitehorse	1,736.0
Beaver	923.0		

District I

This district extends from the mouth of the Yukon to just below Mountain Village. A total of 772 kings, 49,625 chums and 1,355 pinks were taken by a total of 166 fishing families. Each fishing family averaged 5.8 persons and kept an average of 7.3 dogs.

The catch was characterized by a very low king catch and a moderately low chum catch. Also 60% of the relatively unimportant pink salmon catch of the Yukon was taken in this district. There is an intensive commercial fishery for king salmon in this district that extended from June through early July and resulted in low numbers of kings being taken for personal use. The potential catch of chums for subsistence purposes was also reduced because of the commercial fishing.

FIGURE 1



2000
1600

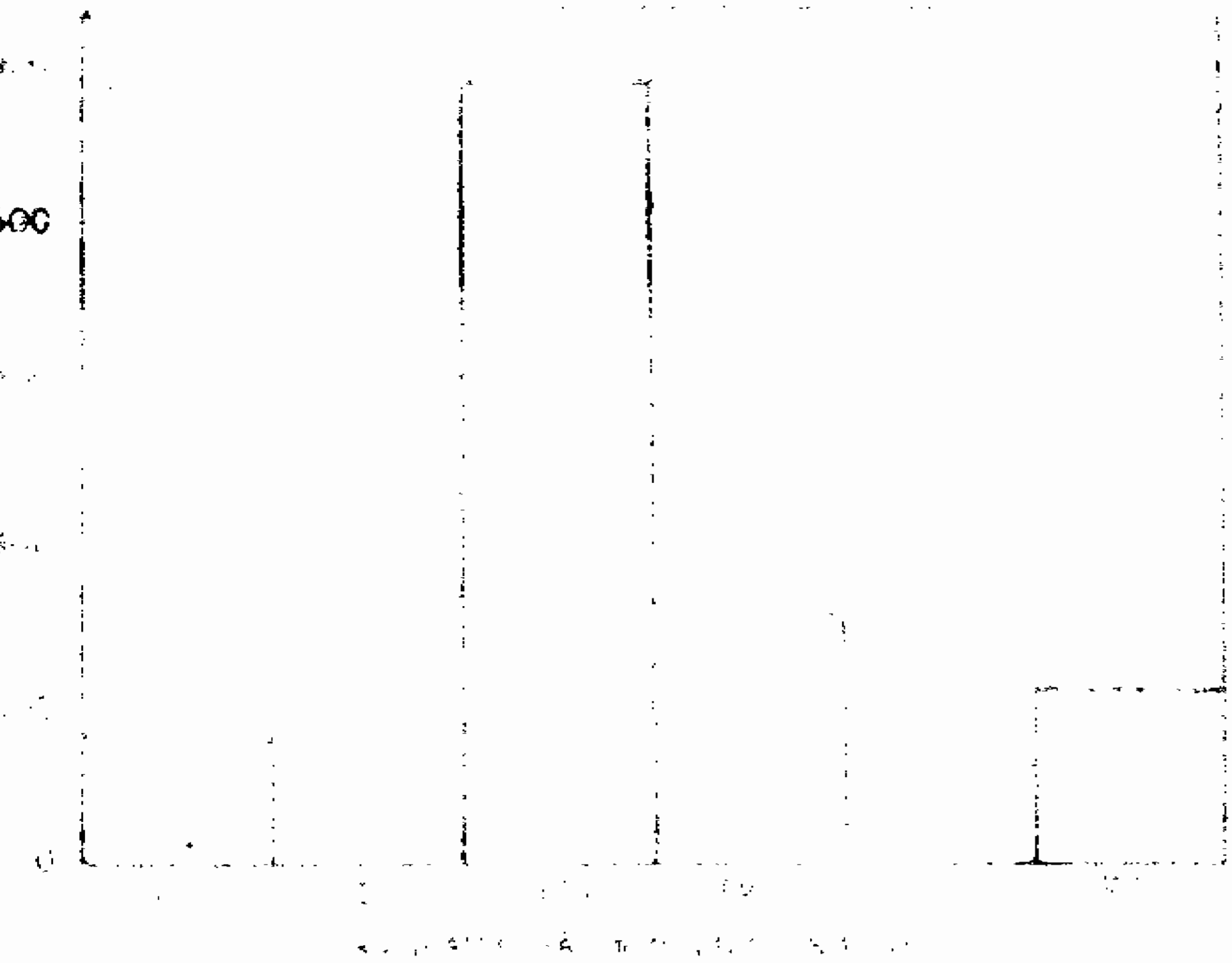
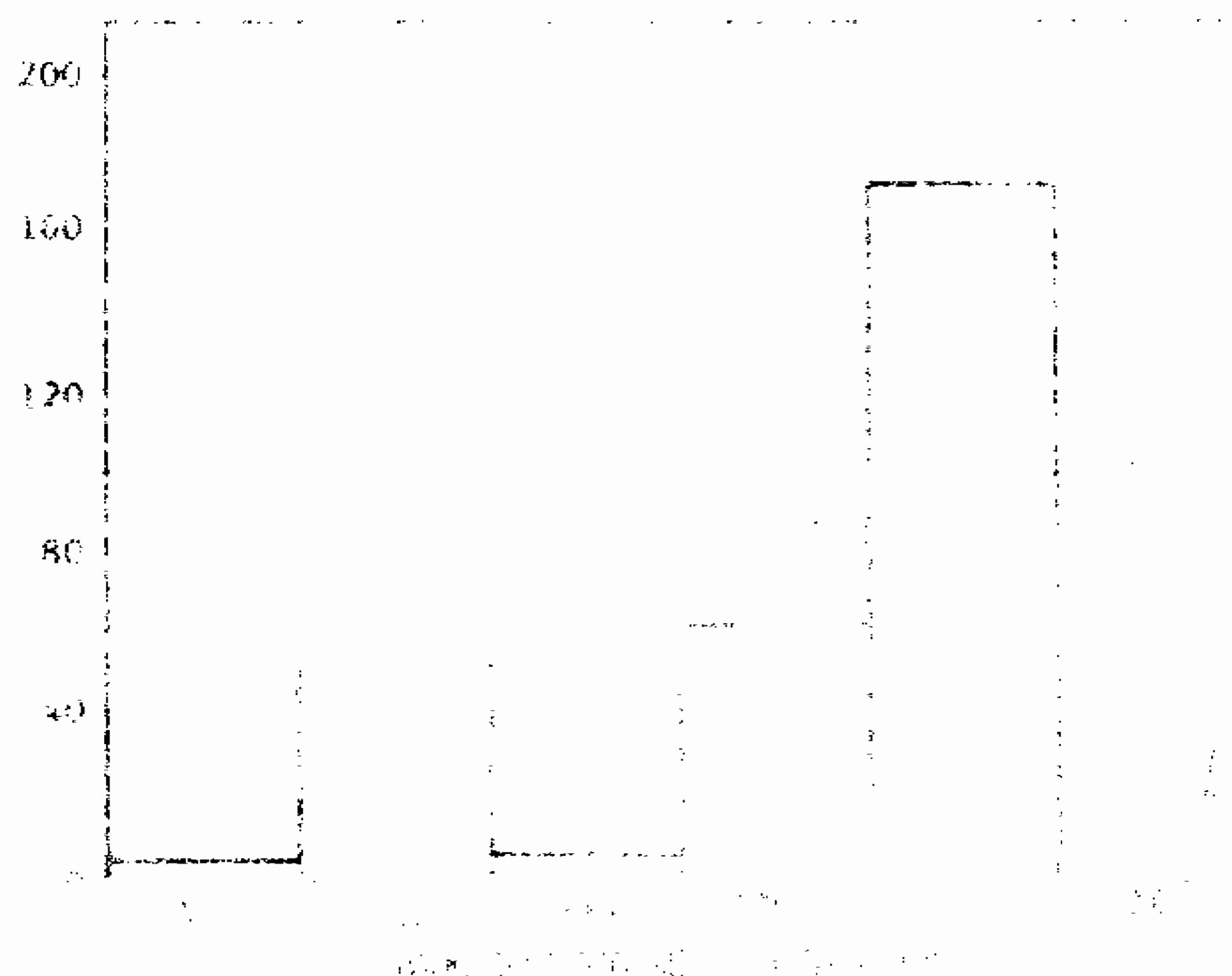


FIGURE 2



2000
1600
1200
800
400





Also many persons not actively engaged in commercial fishing, who normally fish for personal use, were employed by local salteries and canneries. Set gill nets of 5½" mesh accounted for most of the subsistence catches.

District II

This district, 194 miles in length, extends from Mt. Village through Holy Cross (it includes both of these villages). A total of 9,149 kings, 52,983 chums, and 779 pinks were taken by 1,008 fishing families. Each fishing family averaged 5.8 persons and kept an average of 6.4 dogs.

A moderate king catch, representing a substantial increase over District I, was made. Although in a commercial fishery, the fishery of this district is not as intensive as that in District I. Also the commercial season was closed 6 days earlier throughout this district and fishermen turned to subsistence fishing earlier in the summer. Another factor to consider is that in many families there usually was one family member fishing for subsistence purposes during the commercial season. The chum catch per family was similar to that of District I. Fishwheels became an important type of fishing gear in this district and shared the catch with 5½" set gill nets.

District III

This district, some 283 miles in length, begins approximately two miles upstream from Holy Cross and extends to just below the village of Koyukuk. A total of 108 fishing families, averaging 5.7 persons a family and 8.5 dogs a family, took 593 kings, 204,248 chums, and 48 pinks. There is virtually no commercial fishing done in this district.

The subsistence catch of kings per family is almost as low as that of District I. Fishwheels comprise the dominant gear and do not take kings, at least in this district, with any appreciable success. Also 8½" mesh gill nets (king net) are scarce in this district and this probably influences the low king take. Fishwheels in this district on the other hand, are very successful in taking chum salmon, as this district had the highest chum catch per family. No pink salmon were observed upstream from the Shageluk-Holikachuk fish camps located on the Yukon midway between Anvik and Kaltag.

District IV

District IV, 510 miles in length, extends from Koyukuk through Fort Yukon (it includes both of these villages). A total of 145 fishing families, averaging 5.9 persons and 9.4

dogs per family, took 8,946 kings and 83,997 chums. There is a limited commercial fishery for king salmon in some villages but it is considered to have little, if any, effect on subsistence catches. Catches per family when compared to other districts appear moderate. The increased take of kings over District III may be attributed to an increase in 8½" set gill nets and increased fishing efficiency of fishwheels in the district for kings.

District V

The district, some 307 miles in length, extends from just upstream of Fort Yukon to Dawson City in Canada, the farthest penetration of the survey team in 1961. A total of 108 fishing families, averaging 5.1 persons and 3.3 dogs per family took 3,602 kings and 1,867 chums. Relatively few people are dependent on subsistence fishing in this district.

The king catch per family represents the highest catch of any district. Fishwheels are the dominant type of gear and take large numbers of kings. The river being narrower and swifter and the kings weaker may result in these salmon migrating closer in-shore thereby becoming more accessible to the fishwheels.

The chum catch is the lowest of any district and may be influenced by few dogs to feed and/or the fact that chums were still being taken in fairly large numbers at the time of the survey.

District VI

This district includes all of the Tanana River drainage. In 1961 it was surveyed as far upstream as Nenana. A total of 31 fishing families, averaging 6.0 persons and 7.7 dogs per family, took 657 kings and 12,912 chums. The catch of kings per family was judged moderately low as compared to other districts. The chum catch was judged as a moderate catch. Fishwheels are fished almost exclusively in District VI.

For that portion of Yukon River subsistence fishery surveyed this year a total of 645 fishing families, averaging 5.8 persons per family took 23,719 kings, 405,632 chums and 2,182 pinks (total 431,533). The average catch per family was 36.8 kings, 628.9 chums and 3.4 pinks for an average of 669.1 for all salmon species.

In 1962 the subsistence survey will cover the mouth to Tanana and the Tanana River drainage. The U. S. Fish and Wildlife Service, currently undertaking investigation of salmon migrating above the proposed Rampart Damsite, will

survey the subsistence catch of the Yukon above Tanana. Both surveys will be standardized, co-ordinated and the information gained will be accessible to both agencies. By splitting the survey up a more intensive study can be made of the subsistence fishery.

Subsistence Fishing Summary

With all the imponderables involved can 1961 be compared with past years? Yes, in some respects.

1. A large number of nets, 577, were used this year. This figure is misleading, since most of this gear did not effectively fish subsistence. 431 of these nets were used at Marshall and below, and these people fished commercially from about June 1 to July 1 to 7. Therefore, they missed a good deal of the early and largest chum run and sold most of the kings caught. Nets participating for the whole river effectively was closer to 200 than 577.

2. 1959 -- No totals are available, but Table II shows catch village by village comparatively for 1958, 1959, and 1961, where data is available. 1959 was a good year for subsistence and commercial fishing.

TABLE II
YUKON RIVER
VILLAGE BY VILLAGE COMPARISON
OF 1958, 1959 and 1961
SUBSISTENCE CATCHES

VILLAGE	K I N G S			C H U M S		
	1958	1959	1961	1958	1959	1961
Black River						
Akulurak	29			2,862		
Sheldon's Pt.	0	3	180	2,500	1,043	12,683
Alakanuk		113	165		2,477	8,932
Kwiguk-Emonuk	0*	293	137	7,000*	13,742	15,670
Aproka Pass			171			7,303
Snotty Slough			8			1,106
Axel Johnson's						
Hamilton		107	111		3,616	3,931
Mt. Village		290	1,110		4,075	7,373
St. Mary's	0*		1,810	4,539*		8,771
Pilot Station	25*		753	2,600*		5,605
Marshall			1,265			5,992
Russian Mission	10	1,251	1,563	3,275	11,882	4,098
Paimiut	8/13 no catch		300	8/13 no catch		1,076
Holy Cross			2,348			20,068
Anvik	19	19	22	34,284	53,523	61,406
Shageluk-Holikachuk	35*	137	25	29,843*	27,636	56,284
Kaltag	0	0	33	23,935	550	23,395
Nulato	0*	0	513	31,007	23,668	63,163
Koyukuk	15*	75	483	10,457	9,250	13,544

TABLE II (cont.)

VILLAGE	K I N G S			C H U M S		
	1958	1959	1961	1958	1959	1961
Galena	550	700	626	7,502+	7,000	10,585
Ruby & Kokrines	823	493	1,060	8,211+	7,080	15,654
Tanana	3,391	1,280	2,379	9,372+	15,197	12,775
Rampart	1,045**	199	605	735+	1,360	11,722
Stevens Village	1,385*	675	650	213+	3,465	3,490
Beaver		150	185		2,500	2,975
Ft. Yukon			2,958			13,252
Circle		550	496		0	992
Eagle	1,200	980	875	100+	75	150
Dawson			2,231			725
Manley Hot Springs			330			1,950
Minto			17			4,536
Nenana		666	310		22,009	6,426
	<u>1958</u>	<u>1959</u>	<u>1961</u>	<u>1958</u>	<u>1959</u>	<u>1961</u>
Expanded Totals	11,890		23,719	334,472		405,632

1958 7/21 to 8/19 Eagle-Mouth. Knapp (1958 Annual Report USFWS)

1959 No indication of completeness of counts. Knapp unpublished data (1959)

1961 7/25 to 9/18 Mouth-Dawson and Tanana River

* = Incomplete census of village with no correction factor available to us.

+ = Incomplete count of Fish.

** = Includes commercial catch.

3. 1958 -- "A poor to fair year." U.S.F.W.S. Bureau of Commercial Fisheries recorded figures for the area from the mouth up to Eagle, not including the Tanana or Koyukuk Rivers. The totals they came up with were: 128 fishwheels and 198 gillnets taking 11,890 kings and 337,522 small salmon. The chum total is low. In an equivalent area this year 133 wheels and 200? nets took 20,831 kings and 391,995 small salmon.

Year	Wheels	Nets	Kings	Small Salmon
1958	128	198	11,890	337,522
1961	144	200	20,831	391,995

In both years counts on kings are relatively complete for the area covered. Table III compares the 1958 and 1961 counts by district using Knapp's U.S.F.W.S., B.C.F. (1958) district criteria, since this is the basis on which he expanded his counts. It is hard to explain why his counts on kings in the lower three districts are so much below 1961.

TABLE III
YUKON RIVER
1958 AND 1961 SUBSISTENCE SURVEYS
COMPARED BY DISTRICT

AREA	K I N G S		C H U M S	
	1958	1961	1958	1961
Yukon Mouth to Mt. Village	329	772	99,563	49,625
Mt. Village through Holy Cross	198	9,149	60,164	52,983
Holy Cross through Koyukuk	57	1,076	174,655	222,792
Koyukuk through Eagle	11,306	9,834		
Totals	11,890	20,831	334,382	325,400

4. 1922 - 41 -- Hard to compare, but king catches run from 5,500 up to 27,000. Chums from 200,000 up to 1,130,000, with latter years mostly in the 3-500,000 range. Wheels range from 141 up to 258 and nets from 46 up to 180. The area apparently covered did not include anything above Tanana on the main river, or any camps on the Koyukuk. An equivalent area this year used 113 wheels, ? nets and took 15,719 kings and 372,326 chums.

5. The survey by Dr. Charles Gilbert and Henry O'Malley in 1920 for the Department of Commerce covers an area exactly

equivalent to 1961 - "a good year, 1920."

Year	G E A R			
	Wheels	Nets	Kings	Chums
1920	301		20,000	860,000
1961	182	200- 250(est.)	23,719	405,632

It must be remembered that dog food requirements of dried fish began dropping drastically after 1931 with the advent of the mail plane. Also, in the past few years trapping has greatly decreased, and with it the need for dog teams.

Taking the overall picture of effort and catch, the 1961 subsistence fishery had a fair degree of success on kings and fair to poor on chums. However, it was noted that there was a definite scarcity of dried chums for sale on the river this fall. This generally indicates a poor chum run.

Morphological Studies, Stream Surveys, & Misc. Biological Data

In addition to morphological measurements taken during the tagging study some scales and measurements were taken from king salmon during the commercial fishery. These have not as yet been worked up and will be presented later as a supplement to this report.

Because of greater commercial fishery activities in the area, and a multitude of new projects, less time was devoted to spawning ground surveys in 1961 than in 1960. However, several important areas were surveyed, and the results are presented in Table IV. It must be remembered that these figures are merely gross indices of run size. Their only value is in comparison to past years. For this reason comparative 1960 surveys have also been presented in Table IV. Surveys prior to this were made by other observers and it is not known if the results are comparable. All surveys were flown in a Cessna 180 with pilot and one observer.

Unfortunately, the small number of streams flown in 1961 does not allow a valid comparison of escapement with 1960. However, in general the numbers of kings counted in 1961 were comparable to numbers seen in 1960. The Anvik River is the only major exception to this statement and in 1960 species identification was uncertain.

Run timing was recorded as nearly as possible in each village during flights up and down the river and during the subsistence survey. Table V presents the timing data accumulated. Village mileages upriver from the mouth are presented. Figure 3 presents graphically the timing of the

peak in the king run at various points upriver. Admittedly, the number of points involved are too few, and the accuracy of such hearsay data too dubious to draw any valid conclusions. However, it is interesting to try to relate the peak of the king run at the mouth with peaks noted at various points upriver. The peak at the south mouth occurred about June 13. This peak can be followed upriver as far as Ruby, showing a constant migration rate of approximately 27 miles per day. At Tanana the data was quite uncertain and did not fit the linear relationship of peaks either above or below this point, but fell squarely between the two lines. The peaks in various villages above Tanana likewise exhibit a relationship fairly close to linear. However, the two lines are about 7 days apart, the peaks above Tanana occurring about 7 days earlier than would be expected if the 27 mile per day migration rate below Tanana were extended to cover the upriver points.

TABLE IV
YUKON DRAINAGE AERIAL SURVEYS
1960 - 1961

Stream	K I N G S				C H U M S				Comments
	1960 Date	Count	1961 Date	Count	1960 Date	Count	1961 Date	Count	
Andreafsky R. (E.FK.)	7/ 7	1,020	7/14	1,003	7/ 7	3,830	7/14	8,110	
	7/23	688			7/23	280			
						10,250C*			
Anvik	7/ 8	1,950	7/14	1,226	7/ 8	11,110	7/14	20,600	1960 counts very poor on chums and species ident. difficult, Otherwise surveys comparable.
30 Mile Stream					7/ 9	1,330	7/15	4,000	1961 count closer to peak.
Split Creek (S. FK.)					7/ 9	1,360	7/12	1,630	1961 count closer to peak.
Nulato R. (S. FK.)	7/ 9	30	7/12	167	7/ 9	1,470	7/12	1,560	
Nulato R. (N. FK.)	7/28	483	7/28	376			7/28	1,070	1961 fair count on kings, poor on chums many carcasses as in 1960.
Gisasa R.	7/24	300	7/28	266	7/24	400	7/28	Many	1961 very poor visibility.
Salcha R.	7/30	1,660	7/27	2,878	7/30	70	7/27	1,152	1960 & 61 good surveys.
Goodpaster R.	7/31	126	7/27	402					" "

C* = Carcasses. Species identification of carcasses not definite.

TABLE V
YUKON RIVER SALMON RUN TIMING
IN VARIOUS VILLAGES IN
1961

Village	Mileage	First Appear	K I N G		E A R L Y-R U N C H U M S		
			Peak	End	Appear	Peak	End
Alakanuk	8	6/ 5+	6/11-15	7/9+	-----	6/21+	
Mt. Village	79	6/ 7+			6/8-15		
Pilot Station	113					6/24	
Holy Cross	270	6/10+	6/20-25+	7/15+	6/20		
Anvik	408	6/17+					
Nulato	475	6/19			6/30	7/6	
Ruby	573	6/21	7/4		6/28	7/8	
Tanana	687	6/25	7/4*		7/3		
Rampart	754	6/24	7/4	7/25	7/15+	8/5+	
Stevens	838	6/24+	7/7+	7/27	7/7		
Beaver	923	6/29	7/10	7/27*	7/4	7/20	9/22+
Ft. Yukon	993	7/2+	7/5-19				
Circle	1,052	7/4+		8/15+			
Eagle	1,204	6/28+	7/20+	9/7+			
Dawson	1,310	7/19	8/20+	8/20+			

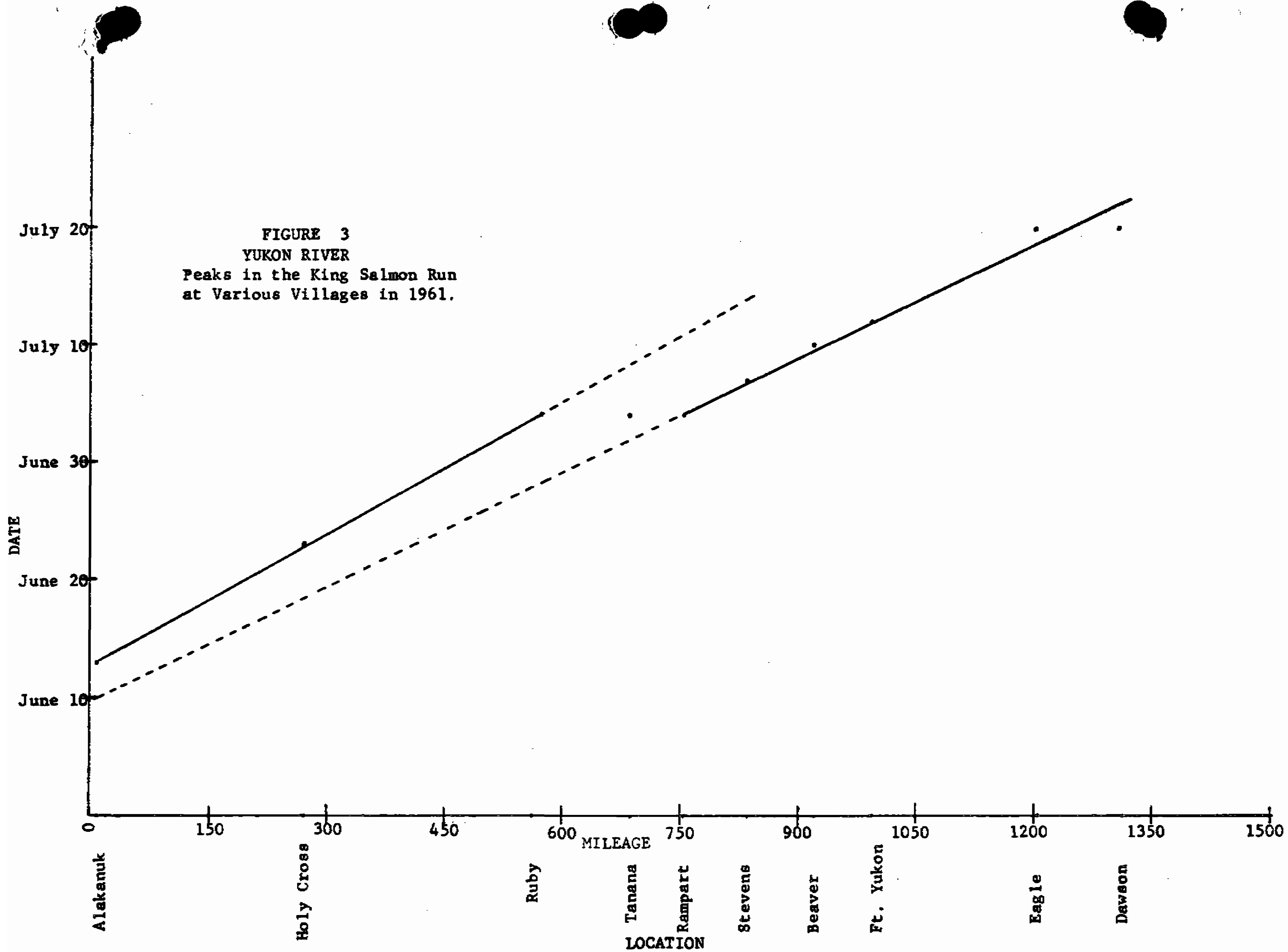
+ Indicates dates not verified in any way and definitely subject to error.

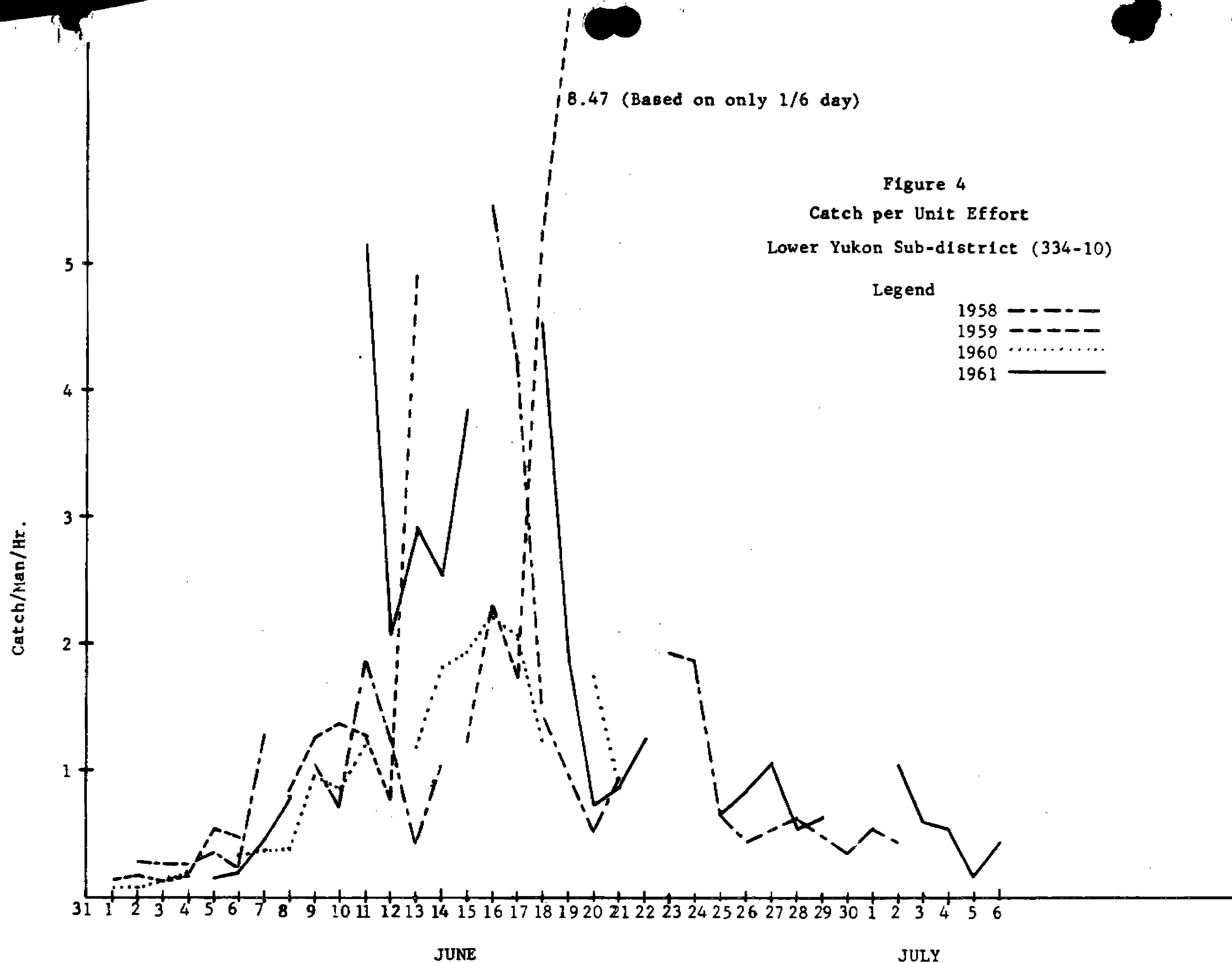
Assuming the data to be valid, and there is no proof of this, the graph in Figure 3 would show one of two things. Either the kings migrate from Ruby upriver to Rampart, a distance of 201 miles, in under one day, or the peak at Rampart has nothing to do with the peak in the commercial fishery at the mouth. Since the commercial catch records show the major peak in the run for the whole river, if the peaks in the subsistence fishery above Rampart do not fall on the extended migration rate line of the major part of the run, it might be concluded that the major part of the run is spawning below Rampart. Extending the rate of travel line for the Rampart and above segment of the run back to the mouth, the peak for that segment of the river would fall on June 9 or 10 at the mouth. Somewhere between June 8 and June 11 is where first appeared indications of the peak in the run that lasted until June 19 and had its high point on June 11 - 15. It would seem possible that the early part of the peak at the mouth was, at least partially, bound for Rampart and above. The first king appeared at Rampart on June 24. Using the same slope for migration rate this king would have to have entered the river on May 30. Perhaps the major part of the run entering the river prior to June 9 this year was bound for spawning areas above Rampart. Catch per unit of effort

figures in the commercial catch show this part of the run to be weaker than in past years. (See Figure 4.)

It is interesting to note in Figure 3 that the migration rate of kings above Rampart can be calculated at approximately 29 miles per day, while the progression of peaks below Rampart shows a migration rate of 27 miles per day.

It is probably more valid to use peak figures from villages than first appearance or end of run figures. First appearance is too dependent on when the people start fishing and the opposite is true of dates for the end of the run. The peak is subjective, but the argument for its use is upheld by comparing it with the dates given for first appearance in Table V. These dates offer little correlation with relative distance traveled from point to point.





Yukon Pack and Commercial Fishery

In 1961 for the first time all the A-Y-K commercial fisheries were managed on a flexible basis of openings and closures rather than a quota system. The Yukon River commercial fishery in the lower two sub-districts was open four days per week and closed three. In sub-district #1, from the mouth to the Anuk River, commercial fishing was allowed from 6 p.m. Sunday to 6 p.m. Thursday of each week. In sub-district #2, from the mouth of the Anuk River upstream to Owl Slough near Marshall, commercial fishing was allowed from 6 p.m. Tuesday to 6 p.m. Saturday. The season opened June 1 and closed July 1 at 6 p.m. in sub-district #2 and July 6 at 6 p.m. in sub-district #1. During this period commercial fishing was allowed for king salmon only and no subsistence fishing was allowed during the closed periods. Forty-eight hours after the close of the season subsistence fishing was allowed seven days per week in these two sub-districts. In the area from Marshall to the Canadian border, 5,000 king salmon commercial quota, both subsistence and commercial fishing were allowed seven days per week. This area closed on June 29 after reaching the quota. After August 1 sub-district #1 and 2 were opened to four days per week commercial

fishing for all species of salmon on the same schedule as the king salmon season. Subsistence fishing continued seven days per week.

Tables VI - XII present the commercial catches by date, number of fishermen, and catch per man per day for all sub-districts on the Yukon. Table XXVI on page 81A is a list of operators in the A-Y-K Area by district and sub-district. Table XXVII on page 82 presents the comparative gear statistics for 1960 and 1961 for the A-Y-K Area. Table XXVIII on page 87 shows the total catch statistics for the A-Y-K Area. Figure 4 shows the average catch per man/hour by day comparative for the years 1958 - 1961 in the lower sub-district.

Originally catch/effort statistics were based on man days, but in the past closures have fallen on half days and this year they fell on $3/4$ and $1/4$ days. To compare these years a standard measurement of effort was needed. Average catch per man per hour by day is used to level out the differences in time fished per day. We are still using a fisherman as the basic unit of effort. 150 fathoms in the aggregate is the maximum allowable amount of gear per man on the Yukon, but very few fishermen use that much. Gear varies from 50-150 fathoms per man with an average probably somewhere around 80-

90 fathoms. Since there is no basis of comparison of this figure for past years, we are forced to assume that the unit, man and gear, has not greatly changed. This introduces a certain amount of error in the comparisons, since the amount of gear used per man has probably increased over the past nine years. Another source of error is that we are comparing catch per hour on a six hour day with 18 and 24 hour days.

TABLE VI
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
LOWER YUKON SUB-DISTRICT
Set Net Catch (04)
334-10

Date	Hours Fished	King Salmon Catch	Number of Fishermen	Average Catch Per Fisherman	Accumu- lative Catch	Catch/ Man/Hr.
June 1						
June 2						
June 3						
June 4						
June 5	24	191	52	3.8	191	.16
June 6	24	447	95	4.7	638	.20
June 7	24	1,205	113	10.7	1,843	.45
June 8	18	1,732	124	14.0	3,575	.78
June 9						
June 10						
June 11	6	1,323	43	30.8	4,898	5.13
June 12	24	9,224	186	49.6	14,122	2.07
June 13	24	11,958	172	69.5	26,080	2.90
June 14	24	8,145	134	60.8	34,225	2.53
June 15	18	12,405	179	69.3	46,630	3.85
June 16						
June 17						
June 18	6	1,660	61	27.2	48,290	4.53
June 19	24	7,345	162	45.3	55,635	1.89
June 20	24	2,888	167	17.3	58,523	.72
June 21	24	3,888	185	21.0	62,411	.88
June 22	18	4,183	186	22.5	66,594	1.25
June 23						
June 24						
June 25	6	134	35	3.8	66,728	.63
June 26	24	3,437	172	20.0	70,165	.83
June 27	24	4,582	181	25.3	74,747	1.05
June 28	24	2,283	176	13.0	77,030	.54
June 29	18	1,955	175	11.2	78,985	.62
June 30						
July 1						
July 2	6	217	34	6.4	79,202	1.07
July 3	24	2,197	156	14.1	81,399	.59
July 4	24	1,748	133	13.1	83,147	.55
July 5	24	504	112	4.5	83,651	.19
July 6	18	755	103	7.3	84,406	.41

Total King Salmon Catch - 84,406
Lower Sub-District, June season

TABLE VII
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
MIDDLE YUKON SUB-DISTRICT
SET NET CATCH* (04)
334-20

Date	King Salmon Catch	Number of Fishermen	Average Catch Per Fishermen	Accumulative Catch
June 1				
June 2				
June 3				
June 4				
June 5				
June 6				
June 7	5	5	1.0	5
June 8	72	19	3.8	77
June 9	196	45	4.4	273
June 10	344	62	5.5	617
June 11				
June 12	31	1	31.0	648
June 13	170	3	56.7	818
June 14	1,384	66	21.0	2,202
June 15	1,592	79	20.2	3,794
June 16	1,150	68	16.9	4,944
June 17	2,134	73	29.2	7,078
June 18	102	1	102.0	7,180
June 19	394	4	98.5	7,574
June 20	352	6	58.7	7,926
June 21	4,238	66	64.2	12,164
June 22	2,569	66	38.9	14,733
June 23	1,821	73	24.9	16,554
June 24	898	43	20.9	17,452
June 25				
June 26				
June 28	452	22	20.5	17,904
June 29	324	3	108.0	18,228
June 30	188	9	20.9	18,416
July 1	153	13	11.8	18,569
July 2	20	1	20.0	18,589
July 3				
July 4				
July 5				
July 6				

* All unmarked tickets which did not show the type of gear used were placed under Set Net Catch.

TABLE VIII
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
MIDDLE YUKON SUB-DISTRICT
DRIFT NET CATCH (03)**
334-20

Date	King Salmon Catch	Number of Fishermen	Average Catch Per Fishermen	Accumu- lative Catch
June 1				
June 2				
June 3				
June 4				
June 5				
June 6				
June 7				
June 8				
June 9	2	1	2.0	2
June 10	5	1	5.0	7
June 11				
June 12	10	3	3.3	17
June 13 (1)	224	3	74.6	241
June 14 (3)	1,033	30	34.4	1,274
June 15	846	32	26.4	2,120
June 16 (1)	516	26	19.8	2,636
June 17 (5)	725	30	24.2	3,361
June 18				
June 19 (3)	1,263	11	114.8	4,624
June 20	341	9	37.9	4,965
June 21 (5)	2,233	36	62.0	7,198
June 22 (7)	867	34	25.5	8,065
June 23 (5)	471	22	21.4	8,536
June 24	146	11	13.3	8,682
June 25				
June 26				
June 27				
June 28 (5)	1,454	34	42.8	10,136
June 29	119	8	14.9	10,255
June 30	80	3	26.7	10,335
July 1	102	6	17.3	10,439
July 2				
July 3				
July 4				
July 5				
July 6				

Total King Salmon Catch - 29,028

** All tickets which showed one fisherman using two types of gear (drift and set nets) on the same day, were placed under drift net catch. The circled numbers indicate the number of fishermen doing so on any given day, i.e. (1), (2), etc.

TABLE IX
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
MIDDLE YUKON SUB-DISTRICT
ALL GEAR COMBINED
334-20

Date	King Salmon Catch	Number of Fishermen	Average Catch Per Fishermen	Accumulative Catch	Hours Fished	Catch/ Man/Hour
June 1						
June 2						
June 3						
June 4						
June 5						
June 6						
June 7	5	5	1.0	5	24	.04
June 8	72	19	3.8	77	24	.16
June 9	198	46	4.3	275	24	.18
June 10	349	63	5.5	624	18	.31
June 11						
June 12	41	4	11.0*	665		
June 13	394	6	65.7	1,059	6	10.95
June 14	2,417	96	25.2	3,476	24	1.05
June 15	2,438	111	22.0	5,914	24	.92
June 16	1,666	94	17.7	7,580	24	.74
June 17	2,859	103	27.8	10,439	18	1.54
June 18	102	1	102.0*	10,541		
June 19	1,657	15	110.5*	12,198		
June 20	693	15	46.2	12,891	6	7.70
June 21	6,471	102	66.3	19,362	24	2.76
June 22	3,436	100	34.4	22,798	24	1.43
June 23	2,292	95	24.1	25,090	24	1.00
June 24	1,044	54	19.3	26,134	18	1.07

TABLE IX (cont.)

Date	King Salmon Catch	Number of Fishermen	Average Catch Per Fishermen	Accumulative Catch	Hours Fished	Catch/ Man/Hour
June 25						
June 26						
June 27	0				6	
June 28	1,906	56	34.0	28,040	24	1.13
June 29	443	11	40.3	28,483	24	1.68
June 30	268	12	22.3	28,751	24	.93
July 1	277	20	13.9	29,028	18	.77
July 2						

576

* Indicates catches from fishermen fishing just below Anuk River on closed days in the middle sub-district.

TABLE X
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
HOLY CROSS
SET NET
334-30

Date	Kings	No. of Fishermen	Catch/ Man/Day	Accumulative Total
June 13				
June 14	48	2	24.0	48
June 15	130	4	32.5	178
June 16	239	6	39.8	417
June 17	195	6	32.5	612
June 18	349	8	43.6	961
June 19	213	8	26.6	1,174
June 20	105	9	11.7	1,279
June 21	361	14	25.8	1,640
June 22	284	8	35.5	1,924
June 23	601	8	75.1	2,525
June 24	618	8	70.8	3,143
June 25	280 *(597)	6	46.7	3,423
June 26	247	7	35.3	3,670
June 27	113	9	12.6	3,783
June 28	54	3	18.0	3,837
June 29	481	10	48.1	4,318
June 30				
July 1				(4,915)
July 2	50	1	50.0	4,965

* Fisherman's total catch for season turned in on one ticket on June 25. This total (597 kings) was not included in the catch of June 25, but was added onto the overall total.

TABLE XI
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
UPPER YUKON SUB-DISTRICT
FISHWHEEL CATCH 66
334-30

Date	King Salmon Catch	Number of Fisherman	Average Catch Per Fisherman	Accumu- lative Catch
June 25				
June 26	288	8	36.0	288
June 27	93	10	9.3	381
June 28	120	5	24.0	501
June 29	510	12	42.5	1,011
June 30	69	4	17.3	1,080
July 1	56	4	14.0	1,136
July 2	119	4	29.8	1,255
July 3	74	3	24.7	1,329
July 4	137	3	45.7	1,466
July 5	42	3	14.0	1,508
July 6	18	3	6.0	1,526
July 7	28	2	14.0	1,554
July 8	44	3	14.7	1,598
July 9	23	3	7.7	1,621
July 10	9	1	9.0	1,630
July 11	34	2	17.0	1,664
July 12	44	1	44.0	1,708
July 13	39	1	39.0	1,747
July 14	12	1	12.0	1,759
July 15	28	1	28.0	1,787
July 16				
July 17	17	1	17.0	1,804

TABLE XII
YUKON RIVER COMMERCIAL SALMON CATCH - 1961
LOWER YUKON DISTRICT - AUGUST SEASON
SET NET CATCH (04)
334-10

Date	King Salmon Catch	Chum Salmon Catch	Pink Salmon Catch	Coho Salmon Catch	Total Catch Per Day	Number of Fishermen	Average Catch Per Fisherman	Accumu- lative Catch
August 1	42	8,295	9	2	8,348	50	167.0	8,348
August 2	1	10,609	26	9	10,645	72	145.3	18,993
August 3	4	6,732	13	11	6,760	71	95.2	25,753
August 4								
August 5								
August 6								
August 7		4,332	13	37	4,382	50	87.6	30,135
August 8	2	3,073	10	40	3,125	57	54.8	33,260
August 9	3	1,724	13	99	1,839	45	40.9	35,099
August 10	3	1,668	28	447	2,146	44	48.8	37,245
August 11								
August 12								
August 13								
August 14	2	2,403	1	403	2,809	46	61.1	40,054
August 15	1	964		123	1,088	39	27.9	41,142
August 16		649	3	367	1,019	43	23.7	42,161
August 17	1	440		267	708	40	17.7	42,869
August 18								
August 19								
August 20		60		90	150	3	50.0	43,019

TABLE XII (cont.)

Date	King Salmon Catch	Chum Salmon Catch	Pink Salmon Catch	Coho Salmon Catch	Total Catch per Day	Number of Fishermen	Average Catch Per Fishermen	Accumu- lative Catch
August 21		1,071		501	1,572	36	43.7	44,591
August 22	1	441		343	785	29	27.1	45,376
August 23								
August 24								
August 25								
August 26								
August 27								
August 28								
August 29				74	74	4	18.5	45,450
August 30				20	20	2	10.0	45,470
August 31				22	22	2	11.0	45,492
Totals	57	42,461	116	2,855				

TABLE XIII
YUKON RIVER COMMERCIAL KING SALMON CATCH
STATISTICS BY SUB-DISTRICT, 1953-1961

YUKON RIVER SUB DISTRICTS:	1953	1954	1955	1956	1957	1958	1959	1960	1961
<u>LOWER: Mouth to</u>									
<u>Mt. Village</u>									
King Salmon Catch	55,247	52,896	49,353	52,149	51,322	50,672	61,018	50,713	84,406
Amount of Gear									
Fished *	5100F-6W	7510F	6165F-1W	4145F	10,363F	8425F-1W	11,795F	21,850F	26,485F
Total Days Fished	21.00	21.00	20.25	18.88	22.75	24.75	14.91	15.83	19.75
Total # Man Days	1,137	1,449				1,817	1,396	1,508	2,815
Avg. # Fishermen									
Per Season	54.0	68.7				73.1	93.5	96.7	130.0
Avg. Catch/Man/ Hr.	1.92	1.45				1.11	1.82	1.08	1.41
<u>MIDDLE: Mt. Village</u>									
<u>to Marshall</u>									
King Salmon Catch	3,247	5,146	8,338	10,479	10,771	11,387	15,934	15,994	29,028**
Amount Gear Fished	820F		1,800F	3510F-5W	3,021F	7,000F-2W	8,050F	5,925F	11,180F
Total Days Fished						22.3	15.0	18.25	15.75
Total #Man Days						1,009	986	1,377	946
Avg. # Fishermen/ Season						51.3	65.5	62.4	56.0
Avg. Catch/Man/ Hour						.44	.50	.43	1.91

TABLE XIII (cont.)

YUKON RIVER SUB-DISTRICTS:	1953	1954	1955	1956	1957	1958	1959	1960	1961
UPPER: Marshall to Canadian Border									
King Salmon Catch	779	1,359	993	850	1,530	1,200	1,680	884	1,804
HOLY CROSS AREA:									
King Salmon Catch									4,965
Total Catch	59,273	59,401	58,684	63,458	63,623	63,259	78,632	67,591	120,260

** Catches made just below the Anuk River on closed days in the Middle sub-district are included in the total catch, but not in the catch/unit effort calculations.

* F = Fathoms of gill net fished.
W = Fishwheels

Catch figures presented here taken from Unit Tables in FWS Annual Reports and ADF&G Annual Reports. In some cases these totals did not match totals given elsewhere in the text of the Annual Reports.

In Figure 4 catches for only the past four years, 1958-1961, are compared for the lower sub-district. The data for 1956 and 1957 was not complete enough to compare on a catch per unit effort basis. Table XIII presents a general run-down of catch and effort data from 1953-1961. As can be seen there has been a great increase in effort over 1958-1961. However, even with this increase in effort, the catch per unit of effort, Figure 4, is at least comparable with 1958 and 1959 and greatly higher than 1960 in the lower sub-district in 1961. 1959 was proclaimed to be a very large king run by fishermen on the river. 1961 did not exhibit as high an average catch per man per hour for the season, but this is at least partially due to the depressant effect of fishing through the tail end of the run. If the average catch per man per hour in the lower sub-district for 1961 up to June 19, the day the season closed in 1959, is computed, it is 2.23 as compared to 1.82 in 1959. Figure 4 illustrates this. While the highest catch per man per hour in 1958 and 1959 exceeds any in 1961, the overall peaking in 1961 is more extended, and higher at most points than in 1958 or 1959. In other words, catch per unit of effort, held up very well, even with the increase in fishing gear. This could mean one of two things. Either the run this year was much larger than in 1958 or 1959, or the run is not

being utilized to the extent that the gear is in competition with itself. The answer probably lies between these two points. In any case, however, escapement through the lower sub-district was probably as great in 1961 as in any of the past three years.

The middle sub-district, Mt. Village to Marshall, is more difficult to analyze. This year several fishermen alternately fished middle and lower sub-districts by the simple expedient of crossing the dividing line when one was closed and fishing in the other. Their catches were included in the middle sub-district statistics no matter which side of the line they were fishing. Therefore, catches appear on what should be closed days in the middle sub-district. Some catches from above Marshall, Ohogamute, were also included in the middle sub-district, since the fish were delivered to a cannery in this sub-district.

Table XIII shows the increase in average catch/man/hour in 1961 over 1960. This increase is at least partially due to the closures in the lower sub-district and the staggering of these closures with those in the middle sub-district. The lower sub-district closed 6 p.m. Thursday of each week, while the middle sub-district did not close until 6 p.m. Saturday

The pack on the Yukon this year amounted to 19,474 cases, 146 $\frac{1}{2}$ tierces of hard salt, and 504 full tierces of king salmon. (In addition some kings, chums and silvers were frozen but poundage figures are not available at present.)

Yukon River Summation

An analysis of all previous sections combined on the Yukon brings out several conclusions, some contradictory, about the overall fate of the king run in the Yukon. Catch statistics from the commercial fishery at the mouth show that a large king run entered the river, and that all segments of it, except perhaps the earliest part were at least on a par with 1959, a run acknowledged by everyone on the river as excellent. The statistics also show that about 3 days per week the king run passed through the lower sub-district and the middle sub-district with very little fishing pressure exerted on it. Segments of the run that were fished in the lower sub-district still produced good catches in the middle sub-district and it is safe to presume that there was some escapement from these portions. A further upriver check point, Holy Cross, 270 miles above the mouth, exhibited good commercial catches. People in the town stated it was a good king run. It appears as though there was a good escapement up to this point, and it is unlikely that the 5,000 kings taken in the

commercial catch here seriously hindered this escapement. There was, however, a 70% increase in the commercial king catch in the lower two sub-districts in 1961 as compared to 1960. This was due to either an increase in gear, or in size of the run, or both. Considering the good catch per unit of effort this year, and the fact that there was an extra $1\frac{1}{2}$ days of closure per week in 1961 over 1960, it would appear that a larger run was mainly responsible for the greater catch. This combined with the Holy Cross catch indicates that there was in general a good escapement through the commercial fishery.

During the course of the summer considerable complaint was heard from points upriver, especially from villages between Koyukuk and Fort Yukon of poor salmon catches, especially kings. Two reasons were mainly given for this, high water or the commercial fishery at the mouth. Most people blamed the high water. Preliminary United States Geological Survey flow figures from Rampart show a 27% increase in flow for the months June, July, August and September over 1959, 52% over 1958, 13% over 1957, 33% over 1956 and 19% over 1955. References from past U. S. Fish and Wildlife Service and Department of Commerce reports, from personal interviews and

of each week and re-opened 6 p.m. Tuesday of the following week. During the two days between the closures of the lower sub-district and the middle sub-district, kings that have not been fished at all reached the extreme downriver portion of the middle sub-district, Anuk River area. Therefore, an artificial peak in the run was created every week at this point in the middle sub-district. Also, when the middle sub-district reopened three days later on Tuesday at 6 p.m., part of this unfished segment of the run entered into the catch in the extreme upper portion of the middle sub-district, Pilot Station to Marshall, thereby creating a peak in the run at this point. The majority of the fishing in the middle sub-district, however, was apparently prosecuted on stocks already fished in the lower sub-district as planned. Still these other factors tended to confuse the issue to the extent that statistics from the middle sub-district do not give a reliable picture of the overall character of the run.

The Holy Cross fishery was an accident of regulation. In 1960 the dividing line between sub-district #2 and sub-district #3 was the Bonasila River. This area was allotted a 5,000 king salmon quota to legalize and permit the many small fresh, smoked and canned salmon commercial operations already

in existence. In 1961 this line was moved down to Marshall. The lower two sub-districts were placed on a timed fishery with a total closure of three days per week during the season. Since no one above Marshall commercial fished to any degree, it was considered unnecessary, unfair and unenforceable to require the subsistence fishermen of Russian Mission and Holy Cross to close for three days per week. For this reason the line was moved down to Marshall, and Russian Mission and Holy Cross became part of the quota, seven days fishing a week area. Operators from Aniak and Bethel took advantage of this and flew the whole 5,000 quota intended to cover the upriver area from Marshall to the Canadian Border out of Holy Cross. The kings were ultimately flown to Anchorage for canning. The catch statistics for this fishery are presented in Table X.

A fishery of this size so far upriver is undesirable. An accident of regulation has created a situation that will be difficult to correct. Requests for the maintenance of this fishery and for similar fisheries in other villages upriver are already being made. From a management standpoint such a situation would be untenable. We cannot have a series of such a fair-sized fisheries spread up and down the river because we cannot control or evaluate them.

experience indicate that water conditions have a definite effect on fishwheel catches. In the areas above Holy Cross fishwheels are the main type of fishing gear used, while below that it is nets. 1958 was generally considered to be a fair to poor year for king salmon in the subsistence fishery. It is also the only other year for which we can say with some degree of certainty that we have a reasonably accurate subsistence utilization figure on kings for the Yukon River. As Tables II and III show 1961's catches were at least comparable and in many cases better than 1958. However, in the area of main complaint, Koyukuk to Ft. Yukon, the catches appear only comparable, not better. Since 1958 was only a fair - poor year, there is probably some basis for the complaint of poor catches. However, on the surface it seems that high water, not commercial catch is the main factor responsible.

Stream surveys seemed to bear this out, although there were too few of them to draw any definite conclusions. The count over Whitehorse Rapids Dam was 1,068 kings and can be used as a stream survey for comparative purposes. In 1960 the count was 1,054 kings and in 1959 666 kings.

In summation the management of the king salmon fishery in the Yukon was apparently successful. A larger catch was allowed than in past years under the quota system but from all outward indications an adequate escapement and as high a subsistence catch as could be expected under prevailing conditions of water and effort was secured.